

PATENT COOPERATION TREATY

(second 20.12.05)

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2005/000411 ✓

International filing date (day/month/year)
18.02.2005 ✓

Priority date (day/month/year)
20.02.2004 ✓

International Patent Classification (IPC) or both national classification and IPC
G01N15/02

Applicant
UNIVERSITA DEGLI STUDI DI MILANO ✓

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☐ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/000411

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: WO 02/103332 A

D2: Brogioli D et al, Appl. Phys. Letters, 81(22), 4109-4111, 25 November 2002

D3: US 5,327,217 A

D4: Glover A R et al, Appl. Optics, 34(36), 8409-8421, 20 December 1995

2. **Independent method claim 1**

D1 (cf. p. 7, para. 6 - p. 9, para. 1; cf. p. 13, para. 5 - p. 15, para. 2) discloses a method of measuring properties of particles, comprising the steps of:

- generating a beam of radiation which is propagated along a principal direction;
illuminating with the beam an observation region which is occupied or transited by a plurality of particles, a portion of the beam being scattered by the particles and another portion being transmitted substantially undisturbed;

- detecting in a plane disposed on the propagation direction a plurality of radiation intensity values which are determined by interference between the scattered radiation and the transmitted radiation; and

- statistically processing the detected radiation intensity values to obtain a power spectrum and determining the particle size distribution from said power spectrum.

Such a method is also described in D2 (cf. whole document).

The method according to independent claim 1 differs from this disclosure in that it comprises the steps of:

- identifying systems of interference fringes associated with the individual particles; and

- determining the properties of the particles on the basis of said fringes.

The method according to claim 1 is therefore new over D1 and D2 (Article 33(2))

PCT).

The problem to be solved by the present invention may therefore be seen in providing an alternative method of deriving particle properties from the detected intensity values.

D3 (cf. col. 1, l. 39-67) describes a method of measuring the size of a particle by evaluating the fringe spatial frequency of a Fraunhofer diffraction pattern obtained by illuminating the particle with a beam of light. The measurement is performed in the geometrical shadow region of the particle, i.e., the detected fringe pattern is caused by interference of secondary spherical waves originating from the boundary of the particle.

D4 (cf. section 2) discloses a method of determining the size of a droplet illuminated with a beam of light. The measurement is performed at 45° scattering angle, i.e., the detected fringe pattern is caused by interference of radiation reflected from and refracted by the droplet.

Contrary to D3 and D4, in the present invention the detected fringe pattern is caused by interference of high intensity transmitted radiation and low intensity scattered radiation. Given this different physical origin of the fringe pattern, the skilled person would not envisage a combination of the teachings of D1 or D2 and D3 or D4.

The method according to claim 1 is therefore considered to be inventive in the sense of Article 33(3) PCT.

3. Independent apparatus claim 17

Claim 17 is directed to an apparatus arranged for implementing the method according to claim 1, which, *mutatis mutandis*, also meets the requirements of the PCT with respect to novelty and inventive step.

4. Dependent claims

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/IB2005/000411

Claims 2-16 and claims 18-25 are dependent on claims 1 and 17, respectively, and as such also meet the requirements of the PCT with respect to novelty and inventive step.
